What is claimed is:

1. A field emission device comprising:

a substrate;

a cathode formed on the substrate;

a gate insulating layer formed on the cathode and having a well exposing a portion of the cathode;

an electron emitter formed on the exposed portion of the cathode; and

a gate electrode formed on the gate insulating layer and having a gate hole corresponding to the well,

wherein the gate electrode further includes a cylindrical electrode part that forms a focusing electric field from the gate hole toward a proceeding path of an electron beam.

2. The field emission device of claim 1, wherein the cylindrical electrode part is a Bellmouse type electrode part that broadens in the direction of propagation of the electron beam.

3. The field emission device of claim 1, wherein the electron emitter is one of micro tips and carbon nanotubes.

4. The field emission device of claim 2, wherein the electron emitter is one of micro tips and carbon nanotubes.

5. The field emission device of claim 1, wherein the field emission device is of a double gate electrode type in which an additional gate electrode is formed beneath a gate electrode on which the cylindrical electrode part is to be formed.

6. The field emission device of claim 2, wherein the field emission device is of a double gate electrode type in which an additional gate electrode is formed beneath a gate electrode on which the cylindrical electrode part is to be formed.

7. A method of manufacturing a field emission device, the method comprising:

(a) sequentially coating a first insulating layer and a second insulating layer having a higher etching rate than the first insulating layer on a substrate on which a cathode is formed, to form a gate insulating layer;

(b) forming a first mask having a window with a predetermined diameter on the gate insulating layer to form a well in the gate insulating layer;

(c) supplying an etchant through the window to form a well that broadens upward in the gate insulating layer beneath the window of the first mask, the well exposing a portion of the cathode;

(d) depositing a gate electrode on the gate insulating layer;

(e) removing a portion of the gate electrode on the bottom and lower inner wall of the well to form a gate hole corresponding to the cathode in the gate electrode; and

(f) forming an electron emitter on the exposed portion of the cathode.

8. The method of claim 7, after step (c), further comprising removing the first mask.

9. The method of claim 7, wherein in step (e), a second mask having a window corresponding to the gate hole is formed, etched, and removed so as to form the gate hole.

10. The method of claim 8, wherein in step (e), a second mask having a window corresponding to the gate hole is formed, etched, and removed so as to form the gate hole.

11 The method of claim 9, wherein step (f) comprises forming a third mask on the gate electrode to expose only a portion of the cathode and cover the remaining area of the cathode so as to form the electron emitter.

12. The method of claim 10, wherein step (f) comprises forming a third mask on the gate electrode to expose only a portion of the cathode and cover the remaining area of the cathode so as to form the electron emitter.

13. The method of claim 11, wherein step (f) comprises forming a third mask on the gate electrode to expose only a portion of the cathode and cover the remaining area of the cathode so as to form the electron emitter.

14. The method of claim 11, wherein in step (f), after forming the third mask, a carbon nanotube paste containing photoresist is coated, and then patterned by photolithography so as to form the electron emitter.

15. The method of claim 13, wherein in step (f), after forming the third mask, a carbon nanotube paste containing photoresist is coated, and then patterned by photolithography so as to form the electron emitter.